UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 9360

CSAH NO. 122

OVER THE

MISSISSIPPI RIVER

DISTRICT 5 - HENNEPIN COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 16A)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge 9360, the East and West Piers, were in good condition above and below water with no defects of structural significance observed. The channel bottom appeared to be degrading between the two piers, which may have lead to a light increase in the extent of partial footing exposure at both piers.

INSPECTION FINDINGS:

(A) All along the east side of the West Pier, the footing was exposed with a maximum vertical face exposure of 3 feet. Sheet piling was observed along the edge of the footing and reinforcing steel was protruding from the top of the footing.

(B) The footing of the East Pier was exposed at the northwest corner, over an area 4 feet wide by 10 feet long, with a maximum vertical exposure of 1 foot.

(C) A minor accumulation of 4 to 6 inch diameter timber debris was observed around the upstream nose of the West Pier.

(D) Random scaling (heaviest at the upstream noses of both piers) was observed from the waterline down 3 feet, with a maximum penetration of ½ inch.

(E) Vertical hairline cracks with efflorescence were observed extending from the top of the webwall to the waterline with 1/16 inch maximum width.

RECOMMENDATIONS:

(A) No plans for the structure were available at the time of the inspection. It is recommended that existing plans be reviewed to determine the foundation type and depth at both piers in regard to the footing exposure. Normally, the foundations of bridges on the Mississippi River are deep and/or founded on piling, which would suggest no reason for concern at this time, if that is confirmed to be the case. If not, countermeasures could be warranted, such as placing riprap around the exposed footing at both piers to prevent further exposure.

(B) Monitor the timber debris, and if found to be increasing in the future, removal operations may become warranted.

(C) Reinspect the submerged substructure units at the normal maximum recommended interval of five (5) years.

PROFESSIONAL ENGINEER
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.
Daniel G. Stromberg
Date 10/15/07 License #21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 9360

Feature Crossed: Mississippi River

Feature Carried: CSAH No. 122

Location: District 5 - Hennepin County

Bridge Description: The superstructure consists of four continuous haunched steel girders supporting a reinforced concrete deck. In addition, a commuter walkway was constructed above the original deck. The superstructure is supported by three reinforced concrete piers and two reinforced concrete abutments. No pier foundation information was available.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan.

Date: October 4, 2007

Weather Conditions: Sunny, 65° F

Underwater Visibility: 0.5 Foot

Waterway Velocity: 0.5 fps

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Piers.

General Shape: The piers consist of a square pier cap supported by three square columns. The columns are connected by a concrete webwall which started above the waterline and extended into the channel bottom. No design plans were available to determine the type of substructure foundation.

Maximum Water Depth at Substructure Inspected: Approximately 14.9 Feet.

4. WATERLINE DATUM

Water Level Reference: Cold Joint on the east face of the East Pier.

Water Surface: The waterline was approximately 4.7 feet below reference. Waterline Elevation = 725.3.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 6

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code P/93

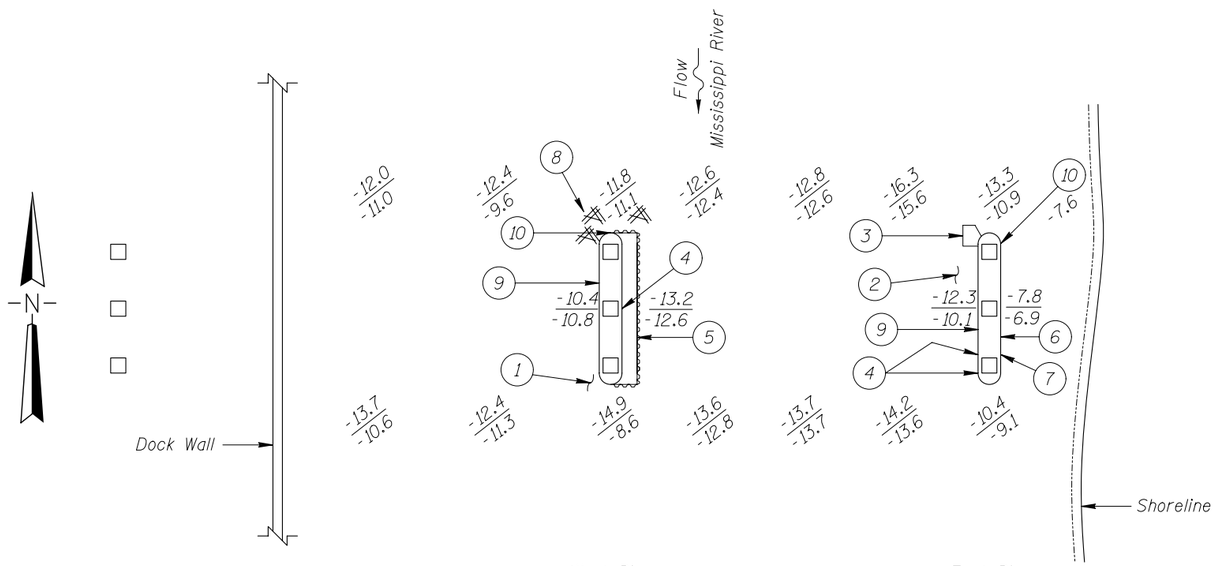
Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

_____ Yes X No

Photograph 1. Overall View of the Structure, Looking South.

Photograph 2. View of West Pier, Looking Northeast.

Photograph 3. View of East Pier, Looking Northeast.



SOUNDING PLAN

GENERAL NOTES:

1. The East and West Piers were inspected underwater.
2. At the time of inspection on October 4, 2007 the waterline was located approximately 4.7 feet below the Bench Mark at Elevation 730.0 referenced at the cold joint on the east face of the East Pier. This corresponds with a waterline elevation of 725.3 based.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom around the West Pier consisted of 2 to 3 foot diameter riprap along the upstream nose. The west side of the pier consisted of sand and gravel with 6 inch maximum penetration.

(2) The channel bottom all around the East Pier consisted of 2 to 3 foot diameter riprap.

(3) Footing exposure at the northwest corner of the East Pier, 4 feet wide by 10 feet long, with 1 foot of vertical exposure.

(4) Vertical hairline crack with efflorescence from the top of the web wall to the waterline with 1/16 inch maximum width.

(5) Footing exposure all along the east face of the West Pier with 3 feet maximum vertical exposure at the downstream nose and protruding reinforcing steel.

(6) Horizontal hairline cracks in random areas along the west face of East Pier.

(7) A spall was observed along a joint at 1 foot below the waterline down 2 feet and was 2 inches wide with up to 1 inch of penetration.

(8) Minor accumulation of 4 to 6 inch diameter timber debris around the upstream nose of the West Pier. Sheet piling was observed along the edge of the footing and reinforcing steel was protruding from the top of the footing.

(9) Overall, concrete was smooth and sound with random minor areas of poor consolidation.

(10) Random scaling (heavier at upstream noses) from waterline to 3 feet below waterline 1/2 inch maximum penetration.

Legend

-2.0 / -5.2	Sounding Depth (10/4/07) / Sounding Depth (10/1/02)
	Timber Debris

Note

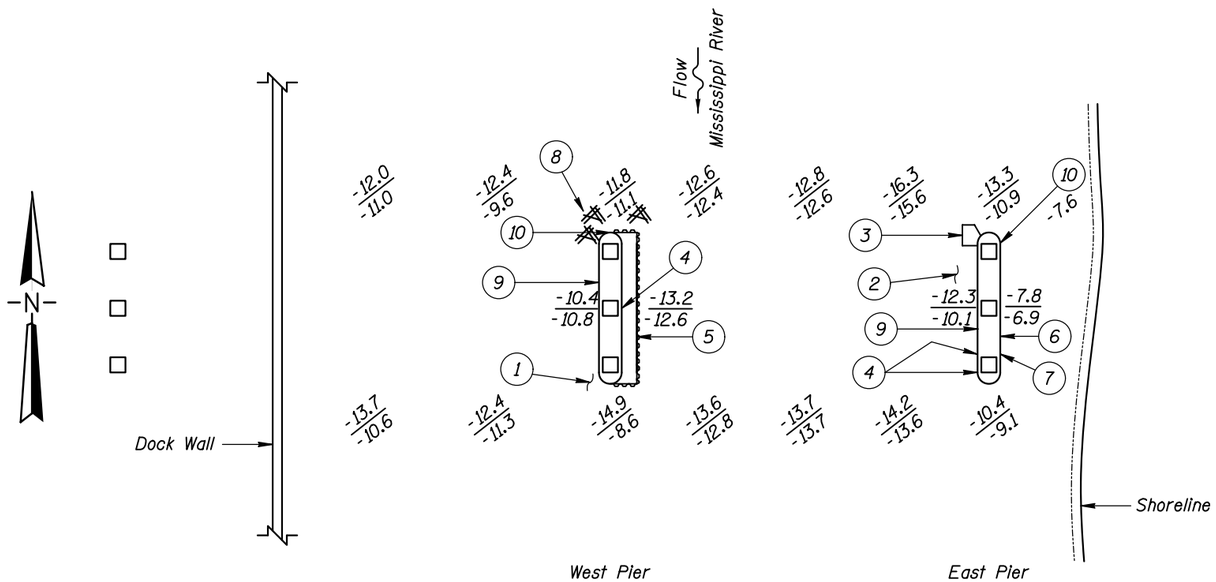
All soundings based on 2007 waterline locaiton.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 9360
OVER THE MISSISSIPPI RIVER
DISTRICT 5, HENNEPIN COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS 123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS		Scale: NTS
Code: 5221016A		Figure No.: 1



SOUNDING PLAN

GENERAL NOTES:

1. The East and West Piers were inspected underwater.
2. At the time of inspection on October 4, 2007 the waterline was located approximately 4.7 feet below the Bench Mark at Elevation 730.0 referenced at the cold joint on the east face of the East Pier. This corresponds with a waterline elevation of 725.3 based.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) The channel bottom around the West Pier consisted of 2 to 3 foot diameter riprap along the upstream nose. The west side of the pier consisted of sand and gravel with 6 inch maximum penetration.

(2) The channel bottom all around the East Pier consisted of 2 to 3 foot diameter riprap.

(3) Footing exposure at the northwest corner of the East Pier, 4 feet wide by 10 feet long, with 1 foot of vertical exposure.

(4) Vertical hairline crack with efflorescence from the top of the web wall to the waterline with 1/16 inch maximum width.

(5) Footing exposure all along the east face of the West Pier with 3 feet maximum vertical exposure at the downstream nose and protruding reinforcing steel.

(6) Horizontal hairline cracks in random areas along the west face of East Pier.

(7) A spall was observed along a joint at 1 foot below the waterline down 2 feet and was 2 inches wide with up to 1 inch of penetration.

(8) Minor accumulation of 4 to 6 inch diameter timber debris around the upstream nose of the West Pier. Sheet piling was observed along the edge of the footing and reinforcing steel was protruding from the top of the footing.

(9) Overall, concrete was smooth and sound with random minor areas of poor consolidation.

(10) Random scaling (heavier at upstream noses) from waterline to 3 feet below waterline 1/2 inch maximum penetration.

Legend

-2.0 / -5.2	Sounding Depth (10/4/07) / Sounding Depth (10/1/02)
	Timber Debris

Note

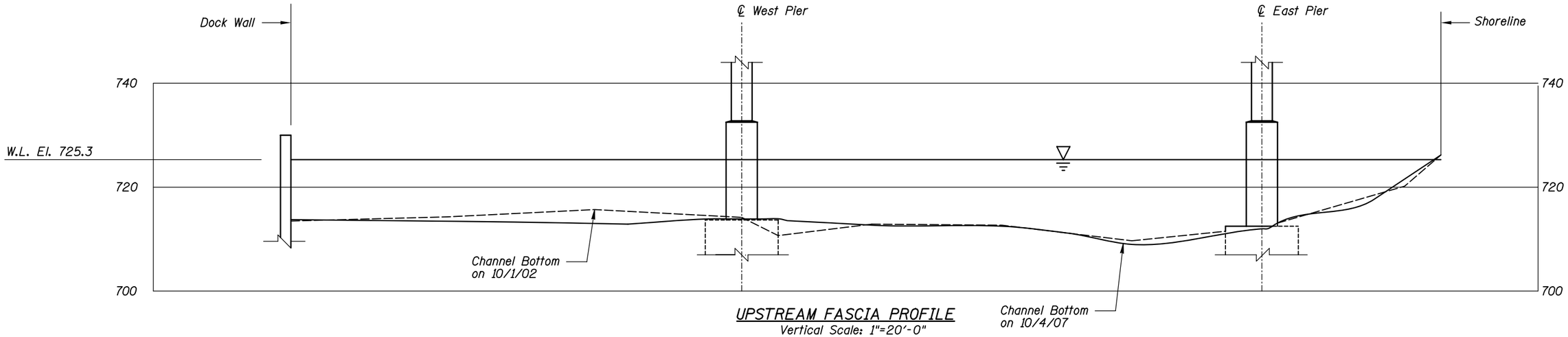
All soundings based on 2007 waterline locaiton.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 9360
OVER THE MISSISSIPPI RIVER
DISTRICT 5, HENNEPIN COUNTY

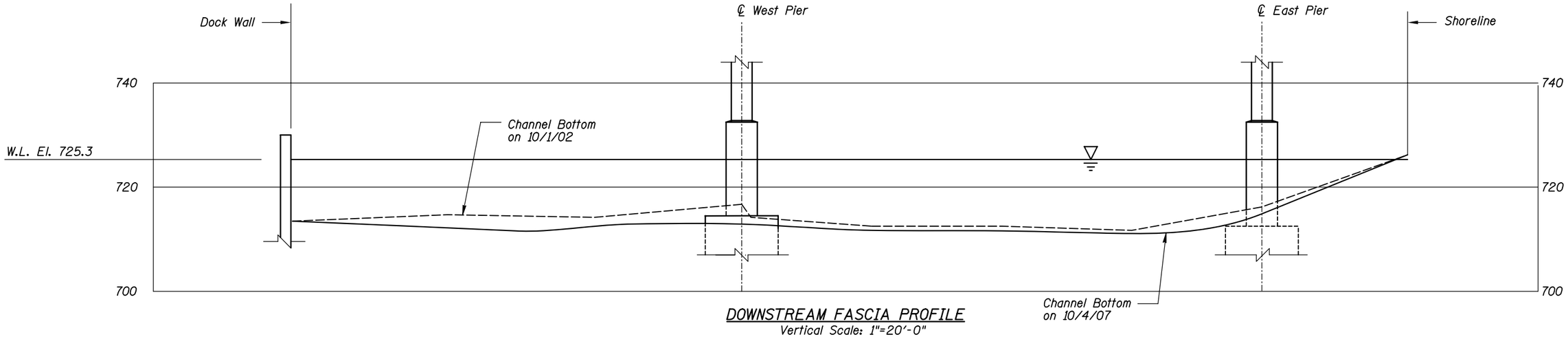
INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS	Date: OCT. 2007
Checked By: DGS	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Scale: NTS
Code: 5221016A		Figure No.: 1



UPSTREAM FASCIA PROFILE

Vertical Scale: 1"=20'-0"



DOWNSTREAM FASCIA PROFILE

Vertical Scale: 1"=20'-0"

Note:

Refer to Figure 1 for General Notes.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

STRUCTURE NO. 9360
OVER THE MISSISSIPPI RIVER
DISTRICT 5, HENNEPIN COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	COLLINS ENGINEERS	Date: OCT. 2007
Checked By: DGS		Scale: NTS (U.O.N.)
Code: 5221016A		Figure No.: 2

123 North Wacker Drive
Suite 300
Chicago, IL 60606
(312) 704-9300
www.collinsengr.com

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 4, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 9360 WEATHER: Sunny, 65°F

WATERWAY CROSSED: Mississippi River

DIVING OPERATION: X SCUBA _____ SURFACE SUPPLIED AIR

_____ OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Boat, Camera, Fathometer

TIME IN WATER: 2:40 p.m.

TIME OUT OF WATER: 3:15 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 0.5 foot

DEPTH 14.9 feet maximum at the West Pier.

ELEMENTS INSPECTED: East and West Piers

REMARKS: Overall, the concrete of the piers was smooth and sound with random minor areas of poor consolidation. The footings at both piers were partially exposed on the main channel side with a maximum vertical exposure of 3 feet along the West Pier and 1 foot at the East Pier. Vertical hairline cracks 1/16 inch maximum width with efflorescence extending from the top of the webwall to the waterline were observed on the east and west faces of the piers. Scaling (heaviest at the noses of both piers) was observed from the waterline to 3 feet below the waterline with ½ inch maximum penetration. A minor accumulation of timber debris consisting of 4 to 6 inch diameter and smaller logs and branches was observed around the upstream nose of the West Pier.

FURTHER ACTION NEEDED: ___X___ YES _____ NO

No plans for the structure were available at the time of the inspection. It is recommended that existing plans be reviewed to determine the foundation type and depth at both piers in regard to the footing exposure. Normally, the foundations of bridges on Mississippi River are deep and/or founded on piling, which would suggest no reason for concern at this time, if that is confirmed to be the case. If not countermeasures could be warranted, such as placing riprap around the exposed footing at both piers to prevent further exposure.

Monitor the timber debris, and if found to be increasing in the future, removal operations may become warranted.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 9360
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Mississippi River

INSPECTION DATE October 4, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	East Pier	13.3’	N	7	7	9	N	7	6	7	6	N	6	7	N	N	N	N	N
	West Pier	14.9’	N	7	7	9	N	7	6	N	8	7	6	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the concrete of the piers was smooth and sound with random minor areas of poor consolidation. The footings at both piers were partially exposed on the main channel side with a maximum vertical exposure of 3 feet along the West Pier and 1 foot at the East Pier. Vertical hairline cracks 1/16 inch maximum width with efflorescence extending from the top of the webwall to the waterline were observed on the east and west faces of the piers. Scaling (heaviest at the noses of both piers) was observed from the waterline to 3 feet below the waterline with ½ inch maximum penetration. A minor accumulation of timber debris consisting of 4 to 6 inch diameter and smaller logs and branches was observed around the upstream nose of the West Pier.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO.
USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.